

TRITOSMINTHURUS SCHUHI, A NEW GENUS AND SPECIES FROM CAPE PROVINCE, SOUTH AFRICA (COLLEMBOLA: BOURLETIELLIDAE)¹

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ABSTRACT: A new genus and species of Bourletiellidae is described from Cape Province, South Africa. It is separated from other members of the family by having a dorsal abdominal hump; lacking a "rastral organ" on the metatibiotarsus; apical bulb on antennal segment IV, ♂ clasping organ; with third antennal segment weakly annulated or subsegmented; unguis with subapical filament and 2-3 heavy, appressed tenent hairs on each leg.

A number of years ago a colleague, Randall T. Schuh, presented a vial of Collembola to me that he had collected while on expedition to South Africa. At the time the literature was in a state of flux and I filed the specimens until revisionary work had been published. Recently, while working on new North American sminthurids, I came across Dr. Schuh's specimens. Using Betsch (1980) to identify and compare various genera, the sample was found to contain a new genus and species in the family Bourletiellidae. My purpose is to report this unique new taxon among those already described.

***Tritosminthurus* gen. n.**

Type species: *Tritosminthurus schuhi* sp. n.

Belonging to the Bourletiellidae *sensu* Betsch, 1980. Antennal segment IV subdivided, apical exsertile bulb absent; antennal segment III basally swollen, giving the appearance of a subsegment, sensillae exposed; maxilla subequal to mandible; pretarsus with anterior setula; unguis small, robust without tunica; unguiculus nonlamellate, with broad apical filament; tenent hairs very thick, infundibulate; tibiotarsi with heavy, conical, smooth, setae on internal surfaces, "rastral organ" absent; retinaculum tridentate; collophore sacs warty; mucronal seta absent, mucro spoon-shaped, edges smooth; ♂ "clasping organ" absent; bothriotrichal pattern linear; body setae long, curving and smooth; great abdomen with posterior mid-dorsal hump.

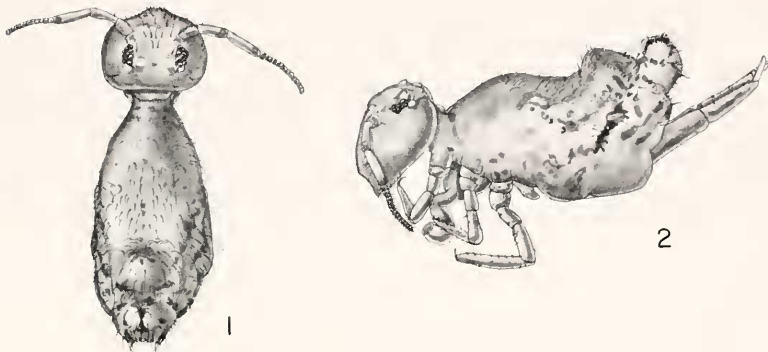
***Tritosminthurus schuhi* sp. n (Figs. 1-41)**

Color description. The following description is based upon specimens preserved in 95% ethanol. Background creamy white with slight pinkish highlights. Color distributed in polygons. Head with light dusting of blue pigment becoming heavier toward occiput; especially heavy on dorsum. A series of white polygons forming an outline

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of a square between eyepatches and antennal bases, area contained within its limits lighter than surrounding field; with small triangular black macula between eyepatches. Black eyepatches with single white dot in their centers. Frontal genal grooves with white linear polygons, genae light blue. Antenna blue, becoming darker distally. Body with faint blue mid-dorsal line; dorsum with light purple patch. Blue pigment concentrated on posterior of abdomen, with heaviest blue lines and black polygons formed laterally and on parafurcular lobes. Anal papilla with dorsal black macula, bothriothrix D surrounded with black pigment. Furcula colorless. Legs with light blue dusting and black maculae at base of tibiotarsus. Bothriothrix A, B, and C surrounded with black pigment. (Figs. 1 and 2).

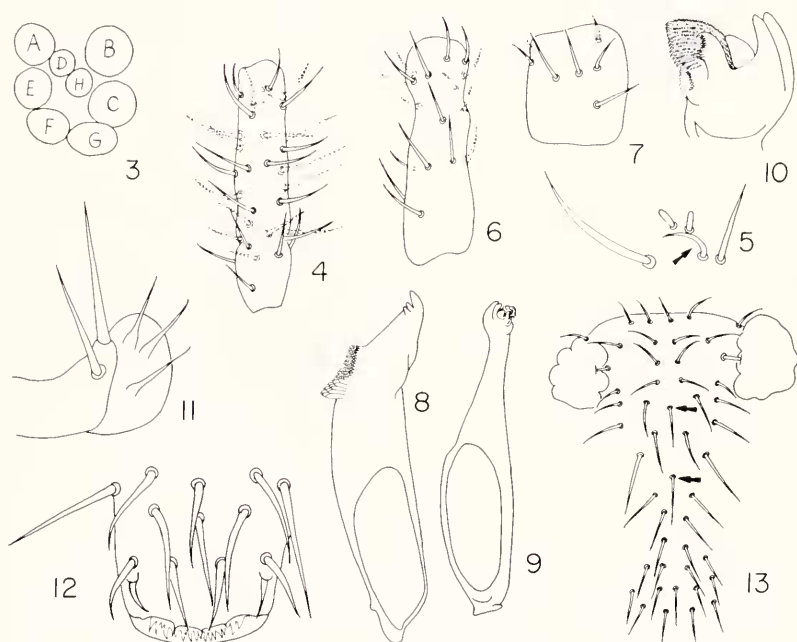


Figs. 1 & 2. *Tritosminthurus schuhi* gen. n., sp. n., 1. Habitus, dorsal aspect., 2. Habitus, lateral aspect.

Morphological description. HEAD: eyes 8+8; ocelli D and H $1/2$ diameter of adjacent (Fig. 3). Antennal segment ratio 1:2:2:5; ANT IV with 12 subsegments, no subapical papilla or apical bulb, subsegments with or without fine setulae in the following distribution: I, II, and XII with none, III-VI with 1, VII-XI with 2; ANT III basally swollen, appearing as a subsegment, subapical sensillae exposed (Fig. 4), accessory seta hooked (Fig. 5); ANT II with 2 ventral setulae (Fig. 6); ANT I with 4 dorsal and 3 ventral setae (Fig. 7). Mandible (Fig. 8) and maxilla (Fig. 9) of equal length, capitulum of maxilla with 3 teeth (Fig. 10). Outer maxillary lobe typically sminthurid type (Fig. 11). Labral setae 2/4/3/5, teeth spine-like (Fig. 12). Postantennal seta and oval organs absent. Interocular cephalic setae curved, seta-like; 2 unpaired frontal setae (Fig. 13). FORELEG: coxa with 1 seta, no oval organ (Fig. 14); trochanter with 3 anterior and 1 posterior setae, with 1+1 oval organs (Fig. 15); femur with 7 anterior and 7 posterior setae, oval organ posterior (Fig. 16); anterior surface of tibiotarsus with 7AI, 7AL and AE₂, AE₄, AE₆ missing, accessory seta missing, E₁ and E₇ missing (Fig. 17); posterior surface of tibiotarsus with PE₅ missing, PL₀ truncate, PL₇ missing, accessory seta truncate, PL₀ truncate, with 5 oval organs (Fig. 18); pretarsus with anterior setula; unguis basally broad, curving, untoothed; unguiculus with subapical filament reaching beyond apex of unguis (Fig. 19). MESOLEG: coxa with 3 anterior setae and 1 oval organ (Fig. 20); trochanter with 5 anterior and 1 posterior setae, 1+1 oval organs (Fig. 21); femur with 12 anterior and 4 posterior setae, oval organ posterior (Fig. 22); anterior surface of tibiotarsus with 7AI, 7AL, and missing AE₂, AE₄, AE₆, accessory seta missing, E₇ missing (Fig. 23); posterior surface with PE₀ truncate, PL₀ truncate, PL₃ missing, accessory seta truncate, PL₅ missing, L₃, L₅ missing, L₄ present, 5 oval organs present (Fig. 24); pre-

tarsus with anterior setula; unguis basally broad, curving, untoothed; unguiculus with subapical filament reaching beyond apex of unguis (Fig. 25). METALEG: coxa with 4 anterior setae and 1 oval organ (Fig. 26); trochanter with 5 anterior and 1 posterior setae, anterior and posterior oval organs present (Fig. 27); femur with 14 anterior and 3 posterior setae, posterior oval organ present (Fig. 28); anterior surface of tibiotarsus with 6AL, 8AL, missing AE₂, AE₄, AE₆, accessory seta missing, E₁, E₇ missing (Fig. 29); posterior surface with PE₀ truncate and PE₅ missing, all other PL setae present, PL₀ truncate, PL₁ present, all other PL setae missing, 8PI setae, L₄ present, accessory seta missing (Fig. 30); pretarsus with anterior setula; unguis broad basally, curving, toothless; unguiculus with subapical filament reaching beyond apex of unguis (Fig. 31). BODY: collophore with 1+1 subapical setae, sacs warty (Fig. 32). Corpus of retinaculum with 4 setulae, ramus with 3 teeth (Fig. 33). Manubrium 8+8 dorsal setae, ventral seta lacking (Fig. 34). Dens with 10 E setae, missing ID₂, ID₄, ID₆, ID₈, and ID₁₁ (Fig. 35); 3Ve₁, 3Ve₂, 2Ve₃, 1Ve₄ and 1Ve₇, 7L and with accessory L (aL) setae present (Fig. 36). Mucro with inner and outer lamellae smooth, rachis apically rounded (Fig. 37). Dorsal circumanal setae smooth, long, and tapering (Fig. 38); ventrally with a few rough setae (Figs. 39 and 40), ♀ subanal appendage spatulate and fringed (Fig. 41). Body setae long, curving and smooth; P seta of bothriothrix D complex smooth. Great abdomen with posterior hump. Length up to 2.25mm.

TYPES: Holotype (♀) and 100+ cotypes in 95% ethanol, 31 dissection slides, all de-



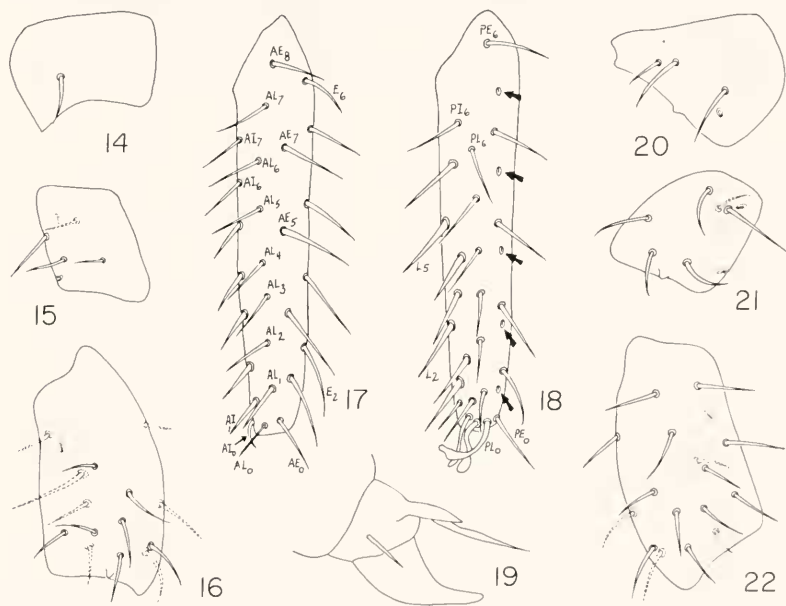
Figs. 3-13. *Tritosminthurus schuhi* gen. n., sp. n., 3. eyepatch, 4. ANT III, 5. accessory seta of ANT III, 6. ANT II, 7. ANT I, 8. mandible, 9. maxilla, 10. maxillary capitulum, 11. outer maxillary lobe, 12. labrum, 13. head, frontal aspect.

posited in the Entomology Museum, Michigan State University. Collection data as follows: South Africa, Cape Province, Cape Point Nature Reserve January 30, 1968, R.T. Schuh, J. and S. Slater, and M. Sweet, collectors.

It is my pleasure to name this new species for Dr. Randall T. Schuh, Department of Entomology, American Museum of Natural History.

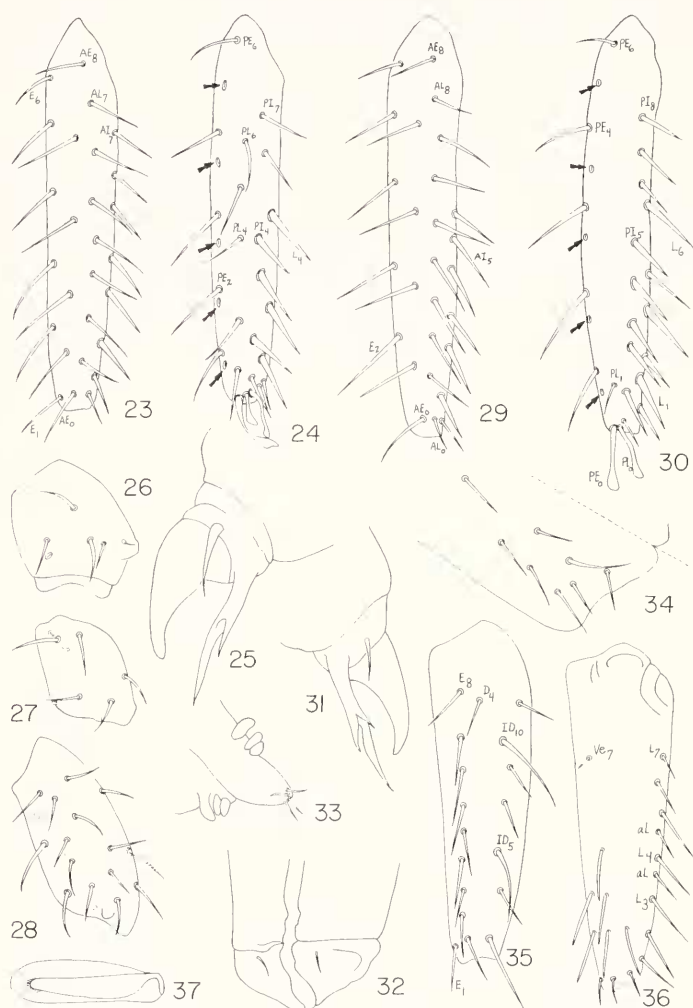
DIAGNOSIS

Initially *T. schuhi* fits into the Bourletiellidae *sensu* Betsch (1980) on the basis of a tridentate retinaculum; two pair of bothriotricha on abdominal segment V; anterior pretarsal seta; and 2-4 thick, appressed tenent hairs. Betsch follows Richard's (1968) analysis of key characteristics for Bourletiellini in setting up his family Bourletiellidae. Following those criteria, *T. schuhi* shares these generic morphological features with other family members: antennal segment IV annulated; interocular vesicles absent; trochanteral spine lacking, seta D3 present; unguis never tuni-



Figs. 14-22. *Tritosminthurus schuhi* gen. n., sp. n., 14. forecoxa, 15. foretrochanter, 16. forefemur, 17. foretibia, anterior surface, 18. foretibia, posterior surface, 19. foreclaw, 20. mesocoxa, 21. mesotrochanter, 22. mesofemur.

cate; posterior surface of pretarsus lacking a setula; mucro spatulate or paddle-shaped, mucronal seta absent; and bothriotrichal pattern ABC linear.

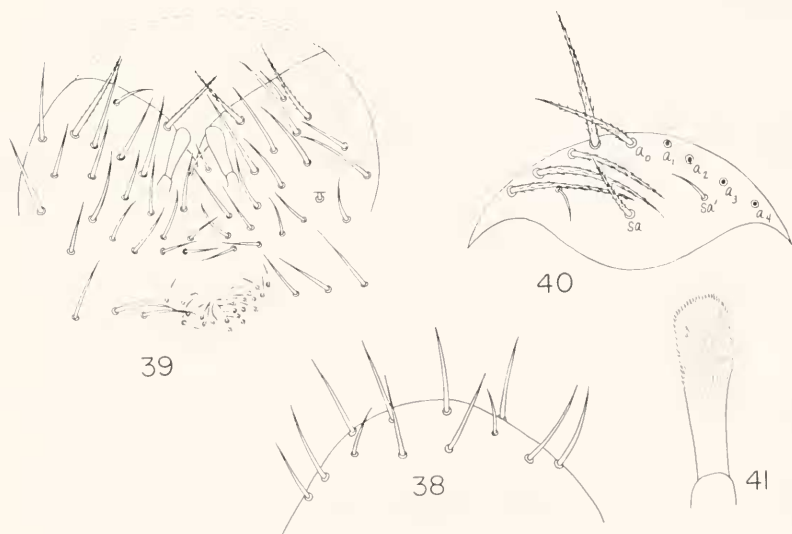


Figs. 23-37. *Tritosminthurus schuhi* gen. n., sp. n., 23. mesotibiotarsus, anterior surface, 24. mesotibiotarsus, ventral surface, 25. mesoclaw, 26. metacoxa, 27. metatrochanter, 28. metafemur, 29. metatibiotarsus, anterior surface, 30. metatibiotarsus, ventral surface, 31. metaclaw, 32. colophore, 33. retinaculum, 34. manubrium, dorsal surface, 35. dens, dorsal surface, 36. dens, ventral surface, 37. mucro.

When first examined and defined, *T. schuhi* was placed in the genus *Stenognathriopes* Betsch & Lasebikan (1979). However, a liberal definition of "rastral organ" as defined by Börner (1906) was used. Dr. Peter F. Bellinger (*in litt.*) pointed out that Betsch & Lasebikan gave a generic definition that has, "tibiotarsal spines dentate". This interpretation is, by opinion, closer to what is generally acceptable as constituting a "rastral organ", that is heavy, with conical setae having denticles. While heavy setae are present on the tibiotarsi, they neither are aligned as a "rastral organ" or are dentate. This condition eliminates both *Stenognathriopes* and *Rastriopes* as designated genera.

Most internal tibiotarsal spines are conical and the fourth antennal segment is subsegmented. These two morphological characteristics place *T. schuhi* close to the genera *Deuterosminthurus* and *Bourletiella*. It differs from those genera by not having an apical retractable bulb; with antennal segment III weakly subsegmented basally; and postero-median hump on abdomen. Further, members of the genus *Deuterosminthurus* sp. do not have unguicular subapical filaments.

It appears that *T. schuhi* is closely related to both *Bourletiella* and *Deuterosminthurus*. It also shares some characteristics with *Rastriopes* and *Stenognathriopes*, especially in lacking an apical bulb on the antenna,



Figs. 38-41. *Tritosminthurus schuhi* gen. n., sp. n., 38. anal papilla, dorsal valve, 39. anal papilla, ventral valves, 40. anal papilla, posterior ventral valve, 41. subanal appendage.

configuration of the claws and enlarged, infundibulate tenent hairs. Still I prefer to place *Tritosminthurus schuhi* between *Rastriopes* and *Deuterosminthurus* in the phylogenetic scheme presented by Richards (1968), rather than the *Rastriopes* and *Stenognathriopes* branch proposed by Betsch (1980). Table I summarizes the morphological characteristics of what appear to be closely related genera.

Table I. Morphological features shared by *Tritosminthurus* n.g. with related genera in the family Bourletiellidae *sensu* Betsch (1980).

CHARACTERISTIC	GENERA								
subannulated antenna	S	P	*	N	PS	B	D	H	T
apical retractile bulb	S	P	*	N	*	B	D	H	*
“rastral organ” present	S	P	R	N	*	*	*	*	*
unguiculus with subapical filament	S	P	*	*	*	B	*	*	T
stiff, thick dorsal setae	S	*	R	*	*	*	*	*	*
one pretarsal setula	*	P	R	N	PS	B	D	H	T
elongate maxilla	S	*	*	*	*	*	*	*	*
retinaculum with three teeth	S	*	*	*	PS	*	*	*	*
retinaculum with two teeth	*	P	R	*	*	B	D	H	T

S - *Stenognathriopes*; P - *Prorastriopes*; R - *Rastriopes*; N - *Nasosminthurus*; PS - *Pseudobourletiella*; B - *Bourletiella*; D - *Deuterosminthurus*; H - *Heterosminthurus*; T - *Tritosminthurus*.

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